INCH-POUND

MIL-M-38510/314C
14 July 2003
SUPERSEDING
MIL-M-38510/314B
23 May 1978

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, LOW-POWER SCHOTTKY, TTL, MONOSTABLE MULTIVIBRATORS, MONOLITHIC SILICON

Inactive for new design after 18 April 1997.

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic silicon, low-power Schottky TTL, monostable multivibrator microcircuits. Two product assurance classes and a choice of case outlines and lead finishes are provided for each type and are reflected in the complete part number. For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).

1.2 Part number. The part number should be in accordance with MIL-PRF-38535, and as specified herein.

1.2.1 Device types. The device types should be as follows:

Device type	Circuit
01	Dual monostable multivibrator, retriggerable, with clear
02	Dual monostable multivibrator, Schmitt trigger inputs, with clear
03	Single monostable multivibrator, retriggerable, with clear

1.2.2 Device class. The device class should be the product assurance level as defined in MIL-PRF-38535.

1.2.3 Case outlines. The case outlines should be as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
A	GDFP5-F14 or CDFP6-F14	14	Flat pack
B	GDFP4-14	14	Flat pack
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
D	GDFP1-F14 or CDFP2-F14	14	Flat pack
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	Flat pack
2	CQCC1-N20	20	Square leadless chip carrier

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, P. O. Box 3990, Columbus, OH 43216-5000, by using the self addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5962

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to 7.0 V dc
Input voltage range	-1.5 V dc at -18 mA to 5.5 V dc
Storage temperature range	-65° to +150°C
Maximum power dissipation per flip-flop, (P_D) 1/	
Device type 01	110 mW dc
Device type 02	149 mW dc
Device type 03	61 mW dc
Lead temperature (soldering, 10 seconds)	300°C
Thermal resistance, junction to case (θ_{JC}):	
Cases A, B, C, D, E, F, and 2	(See MIL-STD-1835)
Junction temperature (T_J) 2/	175°C

1.4 Recommended operating conditions.

Supply voltage (V_{CC})	4.5 V dc minimum to 5.5 V dc maximum
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.7 V dc
Case operating temperature range (T_C)	-55° to +125°C
Minimum pulse width	40 ns
Input pulse rise/fall time, device type 02	
Schmitt, B input	1 V/s minimum
Logic, A input	1 V/µs minimum
Clear-inactive-state setup time	
Device type 02	15 ns minimum
External timing resistance, Rext	
Device type 01, 03	5 kΩ minimum, 180 kΩ maximum
Device type 02	1.4 kΩ minimum, 70 kΩ maximum
External timing capacitance, Cext	
Device type 01, 03	No restriction
Device type 02	1,000 µF maximum
Output duty cycle, device type 02	
R_T = 2 kΩ	50% duty cycle maximum
T_T = 70 kΩ	90 % duty cycle maximum
Wiring capacitance, Rext/Cext terminal	
Device type 01, 03 (referenced to GND)	50 pF maximum

1/ Must withstand the added P_D due to short-circuit test (e.g., I_{OS}).
2/ Maximum junction temperature shall not be exceeded except for allowable short duration burn-in screening conditions in accordance with MIL-PRF-38535.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and Standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Departments of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-38535 - Integrated Circuits (Microcircuits) Manufacturing, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Method Standard for Microelectronics.
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines

(Unless otherwise indicated, copies of the above specifications and standards are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. Microcircuits furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturers list before contract award (see 4.3 and 6.4).

3.2 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38535 and as specified herein or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein.

3.3.1 Terminal connections and logic diagrams. The terminal connections and logic diagrams shall be as specified on figure 1.

3.3.2 Truth table and functional description. The truth table and functional description shall be as specified on figure 2.

3.3.3 Schematic circuits. The schematic circuits shall be maintained by the manufacturer and made available to the qualifying activity and the preparing activity upon request.

3.3.4 Case outlines. The case outlines shall be as specified in 1.2.3.

3.4 Lead material and finish. The lead material and finish shall be in accordance with MIL-PRF-38535 (see 6.6).

3.5 Electrical performance characteristics. The electrical performance characteristics are as specified in table I, and apply over the full recommended case operating temperature range, unless otherwise specified.

3.6 Electrical test requirements. The electrical test requirements for each device class shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table III.

3.7 Marking. Marking shall be in accordance with MIL-PRF-38535.

3.8 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 10 (see MIL-PRF-38535, appendix A).

4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not effect the form, fit, or function as described herein.

4.2 Screening. Screening shall be in accordance with, MIL-PRF-38535 and shall be conducted on all devices prior to qualification and quality conformance inspection. The following additional criteria shall apply:

a. The burn-in test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II, except interim electrical parameters test prior to burn-in is optional at the discretion of the manufacturer.

c. Additional screening for space level product shall be as specified in MIL-PRF-38535, appendix B.

4.3 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-38535.

4.4 Technology Conformance Inspection (TCI). Technology conformance inspection shall be in accordance with MIL-PRF-38535 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4).

4.4.1 Group A inspection. Group A inspection shall be in accordance with table III of MIL-PRF-38535 and as follows:

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, and 6 shall be omitted.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified	Device types	Limits		Unit
				Min	Max	
High level output voltage	V_{OH}	V_{CC} = 4.5 V, V_{IL} = 0.7 V, V_{IH} = 2.0 V, I_{OH} = -400 µA	All	2.5		V
Low level output voltage	V_{OL}	V_{CC} = 4.5 V, V_{IL} = 0.7 V, V_{IH} = 2.0 V, I_{OL} = 4 mA	All		0.4	V
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V, I_{IN} = -18 mA, T_C = +25°C	All		-1.5	V
Low level input current	I_{IL1}	V_{CC} = 5.5 V, V_{IN} = 0.4 V	01, 03	-160	-400	µA
Low level input current at clear input	I_{IL2}		02	-30	-680	
Low level input current at A_{IN}			02	-30	-400	
Low level input current B_{IN}			02	-30	-580	
High level input current	I_{IH1}	V_{CC} = 5.5 V, V_{IN} = 2.7 V	All		20	µA
High level input current	I_{IH2}	V_{CC} = 5.5 V, V_{IN} = 5.5 V	All		100	
Short circuit output current	I_{OS}	V_{CC} = 5.5 V, V_{IH} = 5.5 V, V_{IL} = GND	All	-15	-130	mA
Supply current (quiescent)	I_{CC1}	V_{CC} = 5.5 V	02		11	mA
Supply current (quiescent or triggered)	I_{CC2}		01		20	
			03		11	
Supply current (triggered)	I_{CC3}		02		27	
Propagation delay time low to high level from input A	t_{PLH1}	V_{CC} = 5.0 V C_L = 50 pF ±5%, R_L = 2 kΩ ±5%	01, 03	5	57	ns
			02	5	113	
Propagation delay time low to high level from input B	t_{PLH2}	Cext = 1/ Rext = 1/	01, 03	5	74	
			02	5	90	
Propagation delay time low to high level from clear	t_{PLH3}		01, 03	5	75	
			02	5	105	
Propagation delay time high to low level from input A	t_{PHL1}		01, 03	5	75	
			02	5	128	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified	Device types	Limits		Unit
				Min	Max	
Propagation delay time high to low level from input B	t_{PHL2}	V_{CC} = 5.0 V C_L = 50 pF ± 10% R_L = 2kΩ ± 5%	01, 03	5	92	ns
			02	5	105	
Propagation delay time high to low level from clear	t_{PHL3}	Cext = 1/ Rext = 1/	01, 03	5	48	ns
			02	5	90	
Minimum pulse width of Q output	$t_{P(MIN)}$	V_{CC} = 5.0 V C_L = 50 pF ± 10%	01, 03		308	ns
Width of Q output pulse	t_{P1}	R_L = 2kΩ ± 5%	02	20	91	
	t_{P2}	Cext = 2/ ±10%	02	70	195	
	t_{P3}	Rext = 2/ ±10%	02	600	850	
	t_{P4}		01, 03	3.0	6.25	µs
	t_{P5}		02	5.5	8.5	ms

1/ For propagation delay tests, see table III for Cext and Rext values.

2/ $t_{P(MIN)}$ test, Cext = open and Rext = 5 kΩ.

t_{P1} test, Cext = open and Rext = 2 kΩ.

t_{P2} test, Cext = 80 pF and Rext = 2 kΩ.

t_{P3} test, Cext = 100 pF and Rext = 10 kΩ.

t_{P4} test, Cext = 1,000 pF and Rext = 10 kΩ.

t_{P5} test, Cext = 1µF and Rext = 10 kΩ.

TABLE II. Electrical test requirements.

MIL-PRF-38535 test requirements	Subgroups (see table III)	
	Class S devices	Class B devices
Interim electrical parameters	1	1
Final electrical test parameters	1*, 2, 3, 7, 9, 10, 11	1*, 2, 3, 7, 9
Group A test requirements	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3, 7, 8, 9
Group B electrical test parameters when using method 5005 QCI option	1, 2, 3 9, 10, 11	N/A
Group C end-point electrical parameters	1, 2, 3, 9, 10, 11	1, 2, 3
Additional electrical subgroups for group C inspections	N/A	10, 11
Group D end-point electrical parameters	1, 2, 3	1, 2, 3

*PDA applies to subgroup 1.

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II MIL-PRF-38535.

4.4.3 Group C inspection. Group C inspection shall be in accordance with table IV of MIL-PRF-38535 and as follows:

a. End-point electrical parameters shall be as specified in table II herein.

b. The steady-state life test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

c. Subgroups 3 and 4 shall be added to group C inspection parameters for class B devices and shall consist of the tests, conditions, and limits specified for subgroups 10 and 11 of group A.

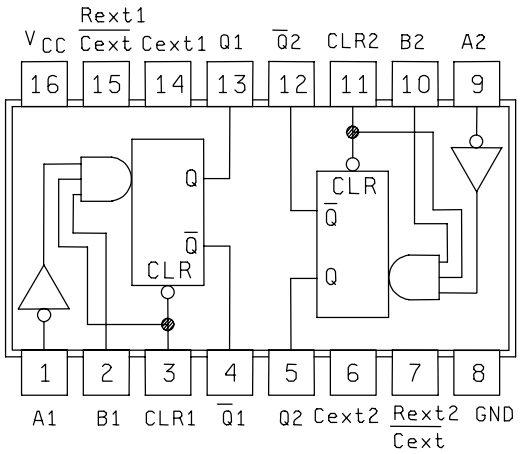
4.4.4 Group D inspection. Group D inspection shall be in accordance with table V of MIL-PRF-38535. End-point electrical parameters shall be as specified in table II herein.

4.5 Methods of inspection. Methods of inspection shall be specified and as follows:

4.5.1 Voltage and current. All voltages given are referenced to the microcircuit ground terminal. Currents given are conventional and positive when flowing into the referenced terminal.

DEVICE TYPE 01

CASES E AND F



CASE 2

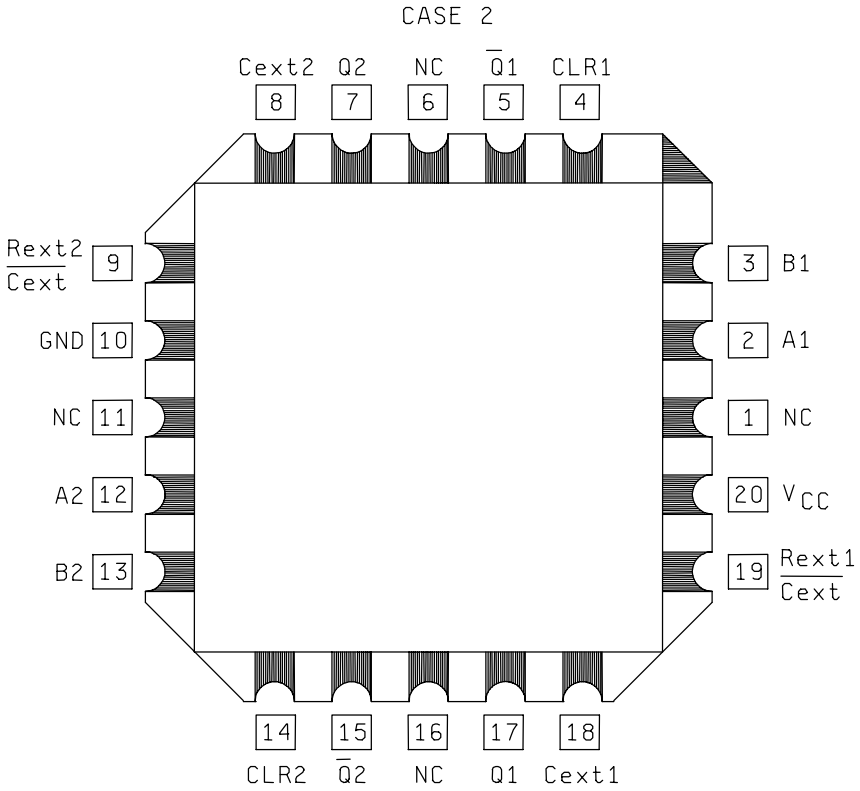
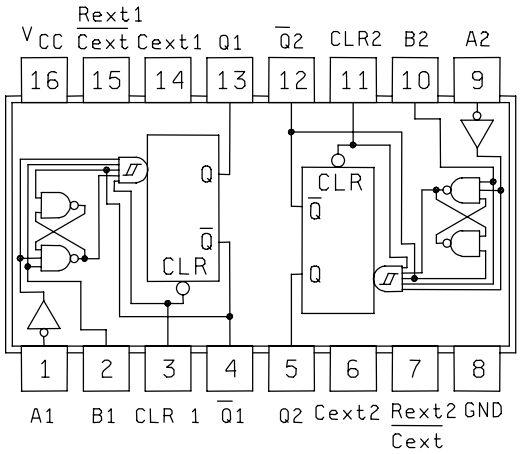


FIGURE 1. Terminal connections.

DEVICE TYPE 02

CASES E AND F



CASE 2

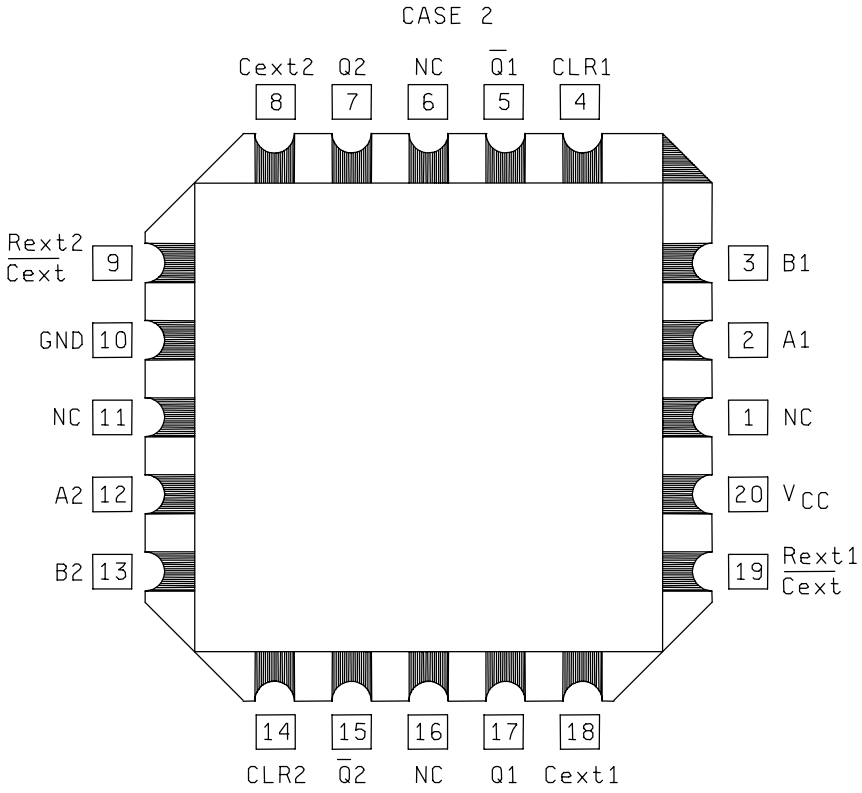
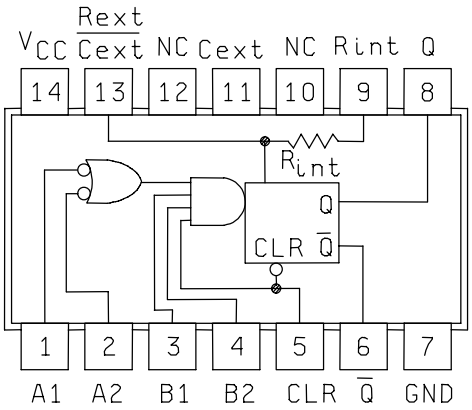


FIGURE 1. Terminal connections - Continued.

DEVICE TYPE 03

CASES A,B,C,AND D



CASE 2

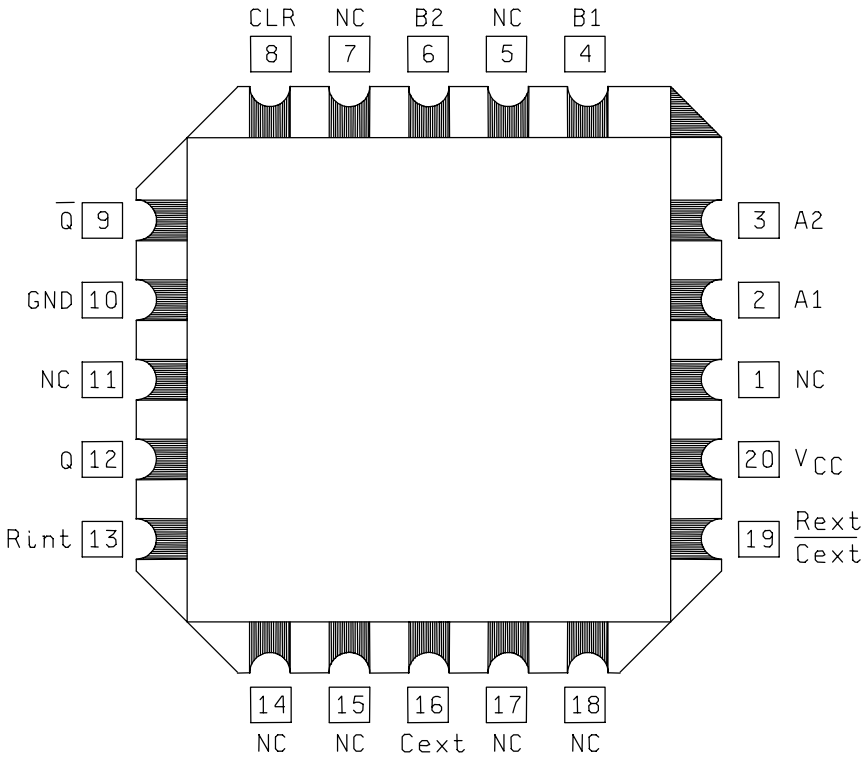


FIGURE 1. Terminal connections - Continued.

Device type 01 and 02

INPUTS			OUTPUTS	
CLEAR	A	B	Q	$\overline{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↑	⊓	⊔
H	↓	H	⊓	⊔
↑	L	H	⊓	⊔

Device type 03

INPUTS					OUTPUTS	
CLEAR	A1	A2	B1	B2	Q	$\overline{Q}$
L	X	X	X	X	L	H
X	H	H	X	X	L	H
X	X	X	L	X	L	H
X	X	X	X	L	L	H
H	L	X	↑	H	⊓	⊔
H	L	X	H	↑	⊓	⊔
H	X	L	↑	H	⊓	⊔
H	X	L	H	↑	⊓	⊔
H	H	↓	H	H	⊓	⊔
H	↓	↓	H	H	⊓	⊔
H	↓	H	H	H	⊓	⊔
↑	L	X	H	H	⊓	⊔
↑	X	L	H	H	⊓	⊔

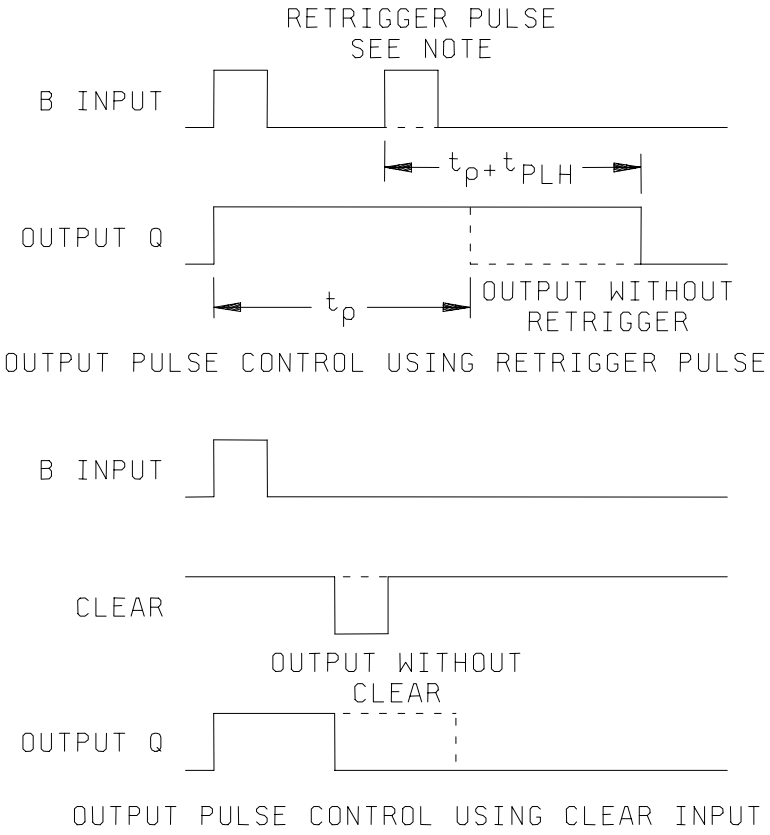
NOTES:

1. H = high level (steady state), L = low level (steady state), ↑ = transition from low to high level, ↓ = transition from high to low level, ⊓ = one high level pulse, ⊔ = one low level pulse, X = irrelevant (any input, including transitions).
2. To use the internal timing resistor of device type 03 connect Rint to V_{CC}.
3. An external timing capacitor may be connected between Cext and Rext/Cext (positive).
4. For accurate repeatable pulse widths, connect an external resistor between Rext/Cext and V_{CC} with Rint open circuited.
5. To obtain variable pulse widths, connect external variable resistance between Rint or Rext/Cext and V_{CC}.

FIGURE 2. Truth table and functional description.

Device types 01 and 03

This multivibrator features d-c triggering from gated low level active (A inputs), and high level active (B inputs). Output pulse width is a function of external capacitor and resistor values. Retriggering of input before output terminates, extends output pulse width. Overriding clear feature permits termination of output pulse width at a predetermined time independent of R and C timing components.



NOTE:
Retrigger pulse must not start before 0.22 Cext (in picofarads) nanoseconds after previous trigger pulse.

FIGURE 2. Truth table and functional description - Continued.

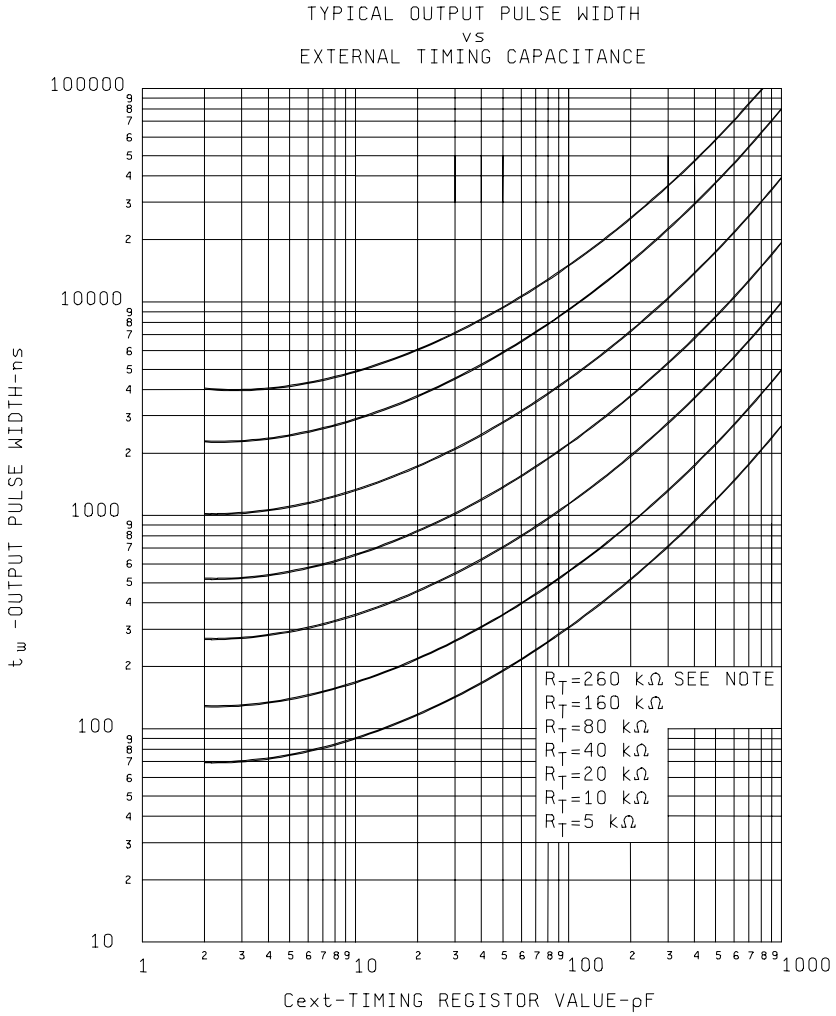
Device type 01 and 03 (Continued)

The output pulse width (tp) is a function of the external capacitor and resistor values.

For output pulse widths when Cext > 1,000 pF, tp is defined as :

tp $\approx$ 0.4 R_T Cext Where R_T is in kΩ, Cext is in pF, and tp is in ns.

For output pulse widths when Cext < 1,000 pF, tp is defined as:



NOTE:
This value of resistance exceeds the maximum recommended for use over the full temperature range

FIGURE 2. Truth table and functional description - Continued.

Device type 02

This multivibrator features a negative transition triggered input and a positive transition triggered input, either of which can be used as an inhibit input. Pulse triggering occurs at a particular voltage level, not directly related to transition time of input pulse. Once fired, the outputs are independent of further transitions of A and B inputs, and are a function of the timing components. Output pulses can be terminated by the overriding clear, independent of R and C timing components.

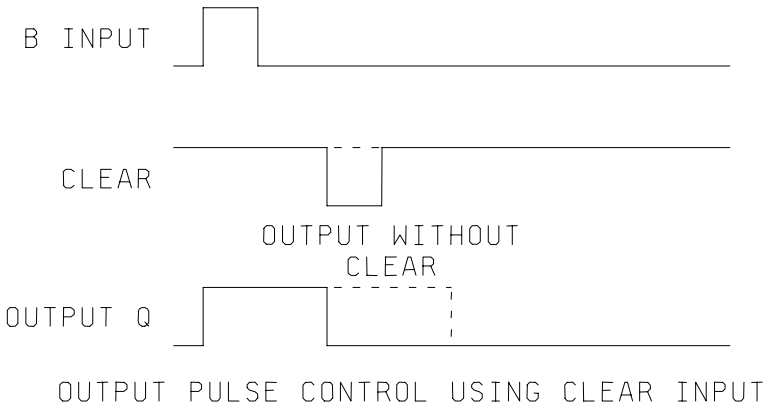


FIGURE 2. Truth table and functional description - Continued.

Device type 02 (Continued)

The output pulse width (tp) is a function of the external capacitor and resistor values.

The output pulse width is defined as :

$tp \approx 0.7\ R_T\ Cext$ Where R_T is in kΩ, Cext is in pF, and tp is in ns.

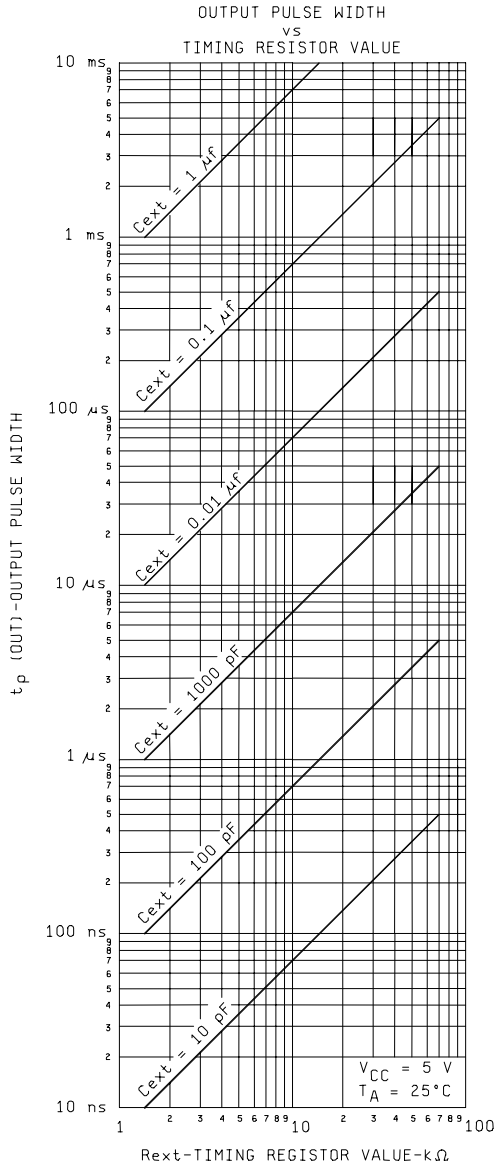
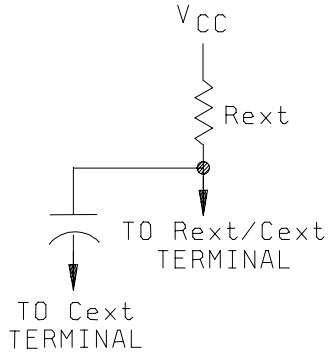


FIGURE 2. Truth table and functional description - Continued.

DEVICE TYPES 01,02 AND 03



TIMING COMPONENT CONNECTIONS

FIGURE 2. Truth table and functional description - Continued.

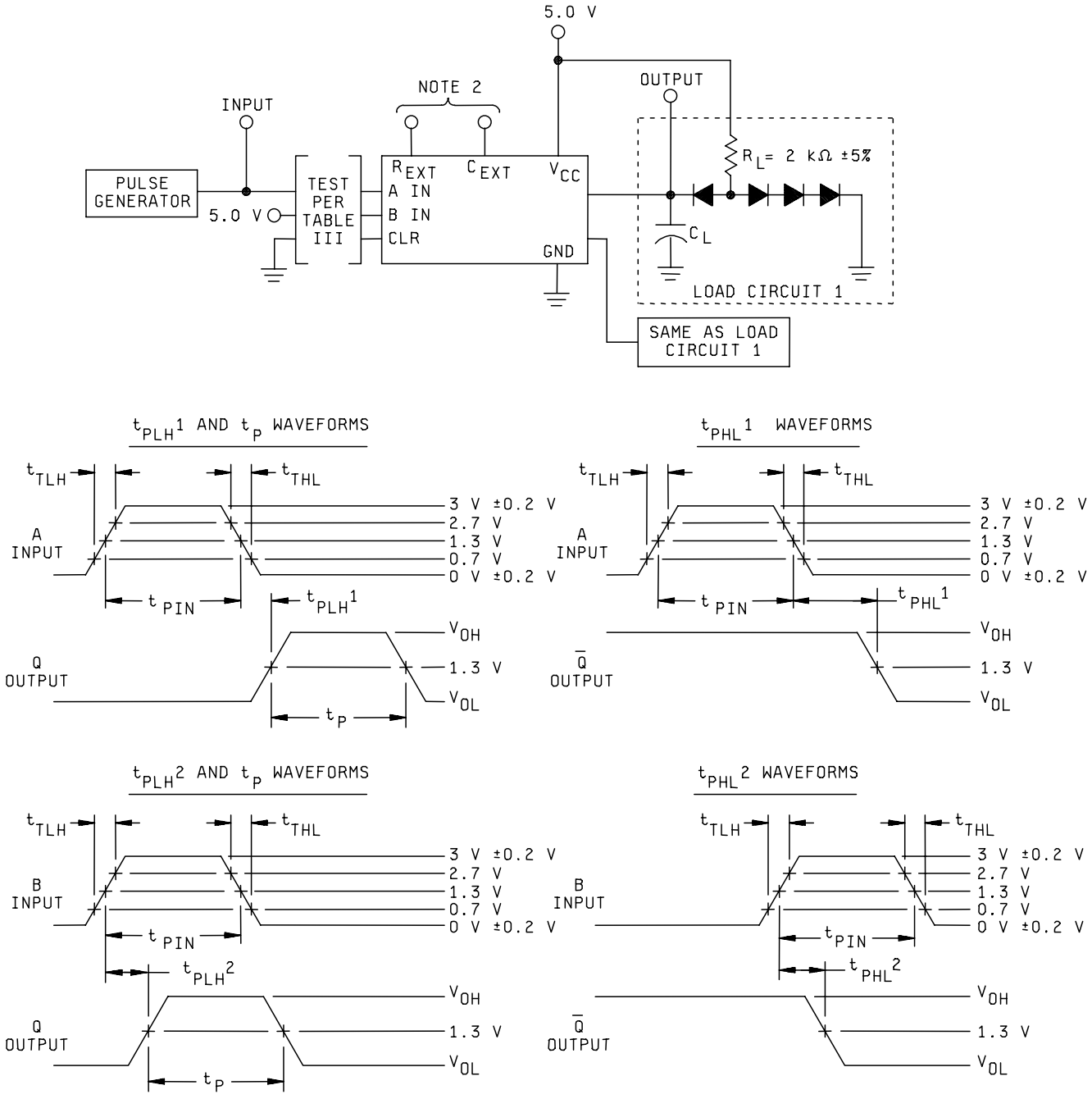
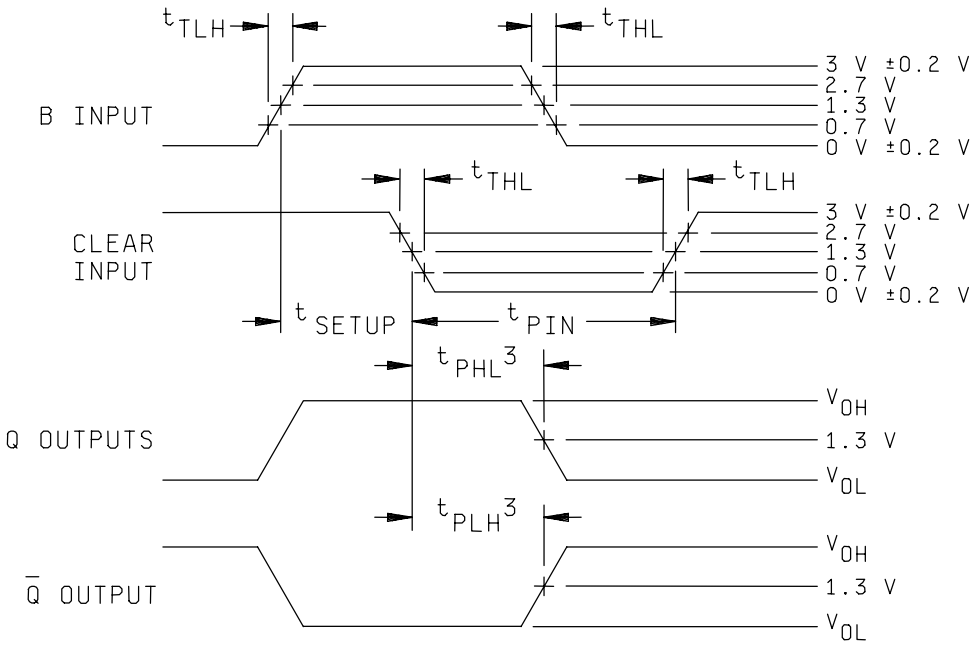


FIGURE 3. Switching test circuit and waveforms for device types 01 and 03.

$t_{PLH}3$ AND $t_{PHL}3$ WAVEFORMS



NOTES:

1. Pulse generator has the following characteristics: PRR ≤ 1.0 MHz, $t_{PIN} \geq 40$ ns, $t_{THL} \leq 6$ ns, $t_{TLH} \leq 15$ ns, and $Z_{OUT} = 50\Omega$.
2. See table III notes for Rext, Cext values.
3. $C_L = 50$ pF ±10% including scope probe, wiring and stray capacitance, without package in test fixture.
4. All diodes are 1N3064, or 1N916 or equivalent.
5. Load circuit on a given output is only required where the specified test in table III indicates "OUT" on that output.
6. t_{SETUP} (max) shall be ≤ 50% of the typical output pulse width for the actual Cext used (see figure 2).

FIGURE 3. Switching test circuit and waveforms for device types 01 and 03 - Continued.

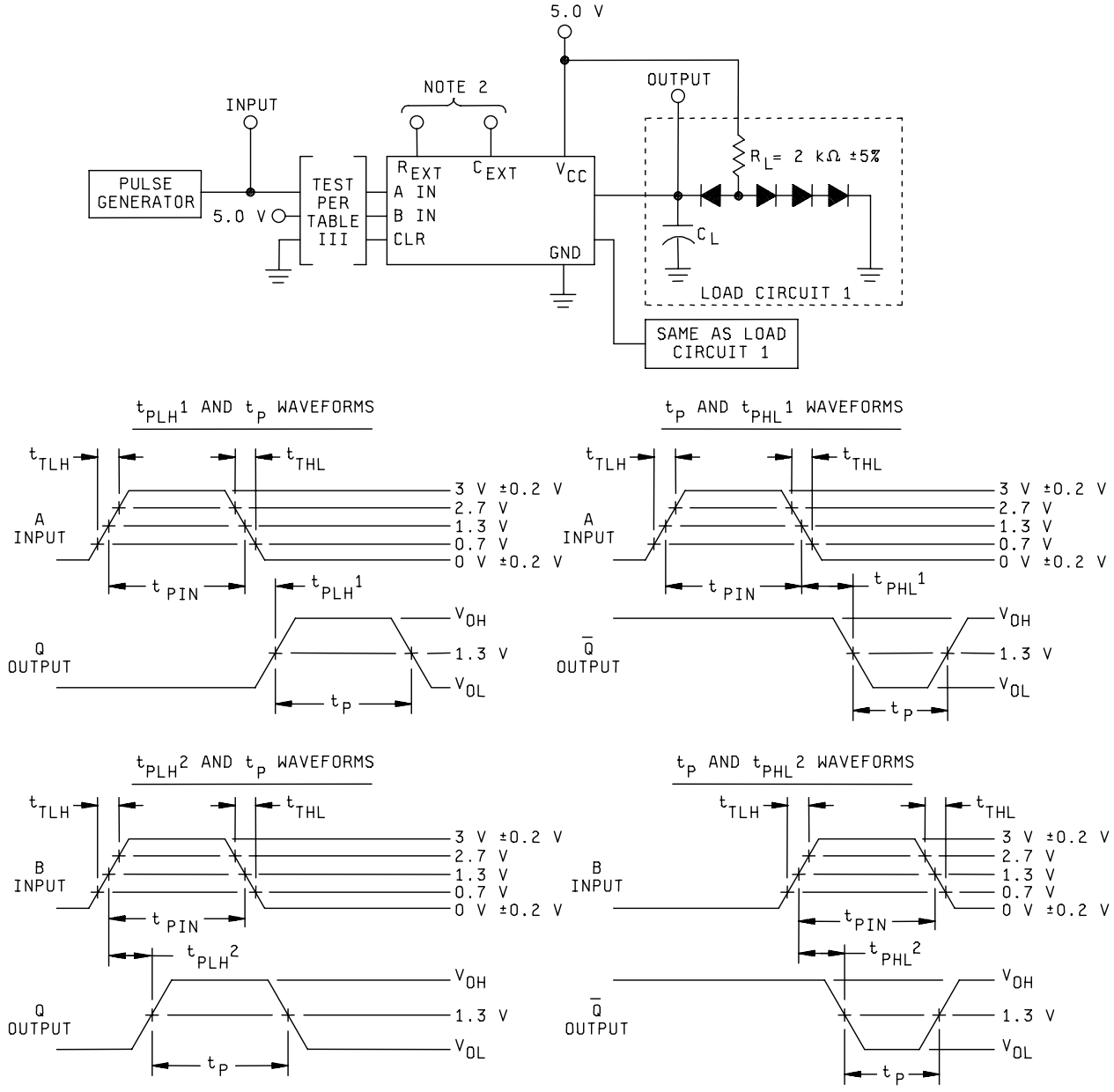
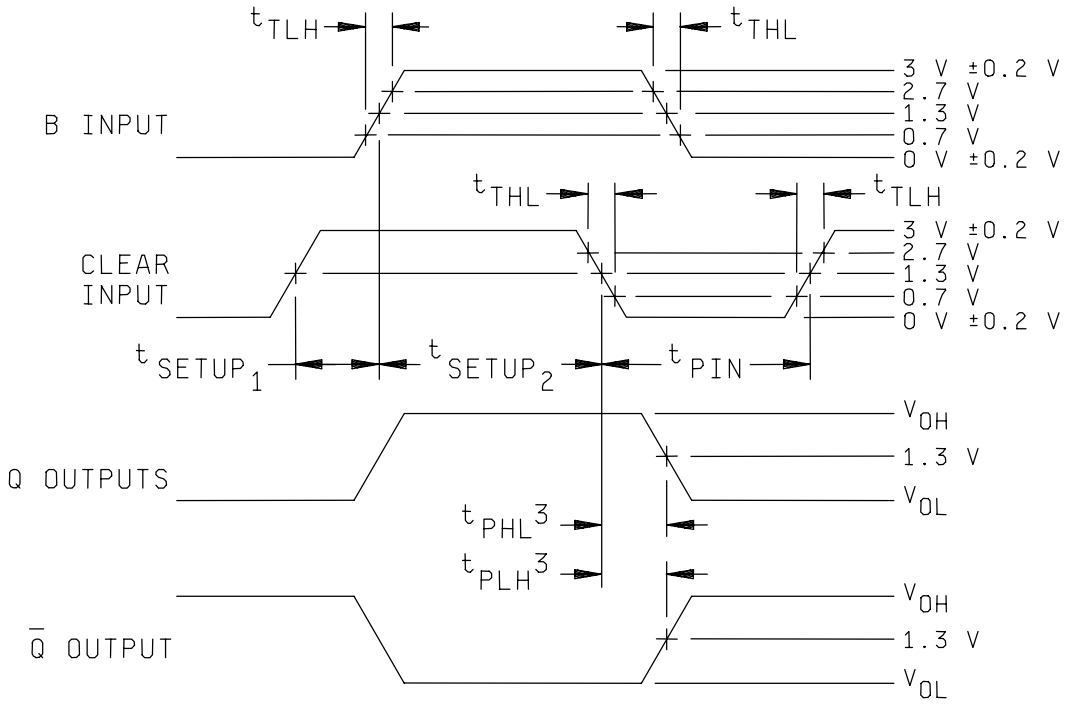


FIGURE 4. Switching test circuit and waveforms for device type 02.

t_{PLH}^3 AND t_{PHL}^3 WAVEFORMS



NOTES:

1. Pulse generator has the following characteristics: PRR ≤ 1.0 MHz, $t_{PIN} \geq 40$ ns, $t_{THL} \leq 6$ ns, $t_{TLH} \leq 15$ ns, t_{SETUP1} (CLEAR INACTIVE) = 15 ns and $Z_{OUT} = 50\Omega$.
2. See table III notes for Rext, Cext values.
3. $C_L = 50$ pF ±10% including scope probe, wiring and stray capacitance, without package in test fixture.
4. All diodes are 1N3064, or 1N916 or equivalent.
5. Load circuit on a given output is only required where the specified test in table III indicates "OUT" on that output.
6. t_{SETUP} (max) shall be ≤ 50% of the typical output pulse width for the actual Cext used (see figure 2).

FIGURE 4. Switching test circuit and waveforms for device type 02 - Continued.

TABLE III. Group A inspection for device type 01.

Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open).

		MIL-	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Subgroup	Symbol	STD-883 method -	Case 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	B1	CLR1	$\overline{Q}1$	Q2	Cext2	Rext2	GND	A2	B2	CLR2	$\overline{Q}2$	Q1	Cext1	Rext1	V_{CC}		Min	Max	
1	V_{OH}	3006	1	2.0 V	0.7 V	2.0 V	-.4 mA				GND								4.5 V	$\overline{Q}1$	2.5		V
Tc = 25°C		"	2	C	2.0 V	2.0 V					"					-.4 mA		GND	"	Q1	"		"
		"	3								"	2.0 V	0.7 V	2.0 V	-.4 mA				"	$\overline{Q}2$	"		"
		"	4					-.4 mA		GND	"	C	2.0 V	2.0 V					"	Q2	"		"
	V_{OL}	3007	5	2.0 V	0.7 V	2.0 V					"					4 mA			"	Q1		0.4	"
		"	6	C	2.0 V	2.0 V	4 mA				"							GND	"	$\overline{Q}1$		"	"
		"	7					4 mA			"	2.0 V	0.7 V	2.0 V					"	Q2		"	"
		"	8							GND	"	C	2.0 V	2.0 V	4 mA				"	$\overline{Q}2$		"	"
	V_{IC}		9	-18 mA							"								"	A1		-1.5	"
			10		-18 mA						"								"	B1		"	"
			11			-18 mA					"								"	CLR1		"	"
			12								"	-18 mA							"	A2		"	"
			13								"		-18 mA						"	B2		"	"
			14								"			-18 mA					"	CLR2		"	"
	I_{IL1} See note K	3009	15	0.4 V							"								5.5 V	A1	-160	-400	µA
		"	16		0.4 V						"								"	B1	"	"	"
		"	17			0.4 V					"								"	CLR1	"	"	"
		"	18								"	0.4 V							"	A2	"	"	"
		"	19								"		0.4 V						"	B2	"	"	"
		"	20								"			0.4 V					"	CLR2	"	"	"
	I_{IH1}	3010	21	2.7 V							"								"	A1		20	"
		"	22		2.7 V						"								"	B1		"	"
		"	23			2.7 V					"								"	CLR1		"	"
		"	24								"	2.7 V							"	A2		"	"
		"	25								"		2.7 V						"	B2		"	"
		"	26								"			2.7 V					"	CLR2		"	"
	I_{IH2}	"	27	5.5 V							"								"	A1		100	"
		"	28		5.5 V						"								"	B1		"	"
		"	29			5.5 V					"								"	CLR1		"	"
		"	30								"	5.5 V							"	A2		"	"
		"	31								"		5.5 V						"	B2		"	"
		"	32								"			5.5 V					"	CLR2		"	"
	I_{OS}	3011	33 CKT A, D	GND	GND	GND	GND				"								"	$\overline{Q}1$	-15	-100	mA
		"	33 CKT C	GND	GND	GND	GND				"								"	$\overline{Q}1$	-30	-130	"
		"	34 CKT A, D	C	4.5 V	4.5 V					"					GND		GND	"	Q1	-15	-100	"
		"	34 CKT C	C	4.5 V	4.5 V					"					GND		GND	"	Q1	-30	-130	"
		"	35 CKT A, D								"	GND	GND	GND	GND				"	$\overline{Q}2$	-15	-100	"
		"	35 CKT C								"	GND	GND	GND	GND				"	$\overline{Q}2$	-30	-130	"
		"	36 CKT A, D					GND		GND	"	C	4.5 V	4.5 V					"	Q2	-15	-100	"
		"	36 CKT C					GND		GND	"	C	4.5 V	4.5 V					"	Q2	-30	-130	"

See footnotes at end of this table.

TABLE III. Group A inspection for device type 01.

Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open). 1/

		MIL-	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Subgroup	Symbol	STD-883 method -	Case 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	B1	CLR1	$\overline{Q}1$	Q2	Cext2	Rext2	GND	A2	B2	CLR2	$\overline{Q}2$	Q1	Cext1	Rext1	V_{CC}		Min	Max	
1	I_{CC2}	3005	37	5.5 V	5.5 V	5.5 V					GND	5.5 V	5.5 V	5.5 V					5.5 V	V_{CC}		20	mA
Tc = 25°C		3005	38	C	5.5 V	5.5 V					GND	C	5.5 V	5.5 V					5.5 V	V_{CC}		20	mA
2	Same tests, terminal conditions, and limits as for subgroup 1, except T_C = +125°C and V_{IC} tests are omitted.																						
3	Same tests, terminal conditions, and limits as for subgroup 1, except T_C = -55°C and V_{IC} tests are omitted.																						
7	Truth	3014	39	A	A	B	H	L	F	F	GND	A	A	B	H	L	F	F	5.0 V	All	See notes		
Tc = 25°C	table	"	40	A	B	"	"	"	"	"	"	A	B	"	"	"	"	"	"	outputs	A, B, D,		
	tests	"	41	B	A	"	"	"	"	"	"	B	A	"	"	"	"	"	"	"	E and F		
		"	42	"	"	A	L	H	"	"	"	"	"	A	L	H	"	"	"	"	"		
		"	43	"	"	B	H	L	"	"	"	"	"	B	H	L	"	"	"	"	"		
		"	44	"	B	B	"	"	"	"	"	"	B	B	"	"	"	"	"	"	"		
		"	45	"	B	A	"	"	"	"	"	"	B	A	"	"	"	"	"	"	"		
		"	46	"	A	A	L	H	"	"	"	"	A	A	L	H	"	"	"	"	"		
		"	47	"	"	B	H	L	"	"	"	"	"	B	H	L	"	"	"	"	"		
		"	48	A	"	B	"	"	"	"	"	A	"	B	"	"	"	"	"	"	"		
		"	49	A	"	A	"	"	"	"	"	A	"	A	"	"	"	"	"	"	"		
		"	50	B	"	A	L	H	"	"	"	B	"	A	L	H	"	"	"	"	"		
		"	51	B	B	B	H	L	"	"	"	B	B	B	H	L	"	"	"	"	"		
		"	52	A	B	A	"	"	"	"	"	A	B	A	"	"	"	"	"	"	"		
		"	53	"	A	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"	"		
		"	54	"	B	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"		
		"	55	B	B	"	"	"	"	"	"	B	B	"	"	"	"	"	"	"	"		
8	Repeat subgroup 7 at T_C = +125°C and T_C = -55°C.																						
9	t_{PLH1}	3003	56	IN	5.0 V	5.0 V					GND					OUT	F	F	5.0 V	A1 to Q1	5	38	ns
Tc = 25°C		Fig. 3	57					OUT	F	F	"	IN	5.0 V	5.0 V					"	A2 to Q2	"	38	"
	t_{PLH2}	"	58					OUT	F	F	"	GND	IN	5.0 V					"	B2 to Q2	"	49	"
		"	59	GND	IN	5.0 V					"					OUT	F	F	"	B1 to Q1	"	49	"
	t_{PLH3}	"	60	GND	IN	IN	OUT				"						L	L	"	CLR1 to $\overline{Q}1$	"	50	"
		"	61						L	L	"	GND	IN	IN	OUT				"	CLR2 to $\overline{Q}2$	"	"	"
	t_{PHL1}	"	62						F	F	"	IN	5.0 V	5.0 V	OUT				"	A2 to $\overline{Q}2$	"	"	"
		"	63	IN	5.0 V	5.0 V	OUT				"						F	F	"	A1 to $\overline{Q}1$	"	"	"
	t_{PHL2}	"	64	GND	IN	5.0 V	OUT				"						F	F	"	B1 to $\overline{Q}1$	"	61	"
		"	65						F	F	"	GND	IN	5.0 V	OUT				"	B2 to $\overline{Q}2$	"	61	"
	t_{PHL3}	"	66					OUT	L	L	"	GND	IN	IN					"	CLR2 to Q2	"	32	"
		"	67	GND	IN	IN					"					OUT	L	L	"	CLR1 to Q1	"	32	"
	$t_{P(MIN)}$	"	68	IN	5.0 V	5.0 V					"					OUT	Open	G	"	Q1		205	"
		"	69	GND	IN	5.0 V					"					OUT	Open	G	"	Q1		"	"
		"	70					OUT	OPEN	G	"	IN	5.0 V	5.0 V					"	Q2		"	"
		"	71					OUT	OPEN	G	"	GND	IN	5.0 V					"	Q2		"	"

See footnotes at end of this table.

TABLE III. Group A inspection for device type 01.

Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open). 1/

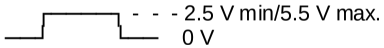
		MIL-	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Subgroup	Symbol	STD-883 method -	Case 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	B1	CLR1	$\overline{Q}1$	Q2	Cext2	Rext2	GND	A2	B2	CLR2	$\overline{Q}2$	Q1	Cext1	Rext1	V_{CC}		Min	Max	
9	t_{P4}	3003	72					OUT	I	I	GND	GND	IN	5.0 V					5.0 V	Q2	3.5	6.0	µs
Tc = 25°C		Fig. 3	73					OUT	I	I	"	IN	5.0 V	5.0 V					"	Q2	"	"	"
		"	74	IN	5.0 V	5.0 V					"					OUT	I	I	"	Q1	"	"	"
		"	75	GND	IN	5.0 V					"					OUT	I	I	"	Q1	"	"	"
10	Same tests and terminal conditions as subgroup 9, except T_C = +125°C and limits are as follows: t_{PLH1} is 5 to 57 ns; t_{PLH2} is 5 to 74 ns; t_{PLH3} is 5 to 75 ns; t_{PHL1} is 5 to 75 ns; t_{PHL2} is 5 to 92 ns; t_{PHL3} is 5 to 48 ns; $t_{P(MIN)}$ is 308 ns; and t_{P4} is 3.0 to 6.25 µs.																						
11	Same tests and terminal conditions as for subgroup 10, except T_C = -55°C																						

NOTES:

A. V_{IN} = 3.0 V minimum.

B. V_{IN} = 0.0 V or GND.

C. Apply input pulse



D. Test numbers 39 through 55 shall be run in sequence.

E. Output voltages shall be either:

H > 1.5 V; L < 1.5 V

F. Rext = 5 kΩ minimum to 180 kΩ maximum, connected to V_{CC}; Cext ≤ 1,000 µF, connected to Rext terminal.

G. Rext = 5 kΩ ±10%, connected to V_{CC}.

I. Rext = 10 kΩ ±10%, connect to V_{CC}; Cext ≤ 1,000 µF ±10%, connected to Rext terminal.

J. During subgroups 9, 10, 11 testing, Rext and Cext may remain applied on the side of the device not under test if desired.

K. For circuit D, I_{IL1} limits are 120 mA to 360 mA.

L. Rext = 10 kΩ ±10%, connect to V_{CC}; Cext ≥ 45 pF connected to Rext terminal.

TABLE III. Group A inspection for device type 02.

Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open).

		MIL-	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Subgroup	Symbol	STD-883 method -	Case 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	B1	CLR1	$\overline{Q}1$	Q2	Cext2 See L	Rext2 See L	GND	A2	B2	CLR2	$\overline{Q}2$	Q1	Cext1 See L	Rext1 See L	V_{CC}		Min	Max	
1	V_{OH}	3006	1	2.0 V	0.7 V	2.0 V	-.4 mA				GND								4.5 V	$\overline{Q}1$	2.5		V
Tc = 25°C		"	2	C	2.0 V	2.0 V					"					-.4 mA	GND	GND	"	Q1	"		"
		"	3								"	2.0 V	0.7 V	2.0 V	-.4 mA				"	$\overline{Q}2$	"		"
		"	4					-.4 mA	GND	GND	"	C	2.0 V	2.0 V					"	Q2	"		"
	V_{OL}	3007	5	2.0 V	0.7 V	2.0 V					"					4 mA			"	Q1		0.4	"
		"	6	C	2.0 V	2.0 V	4 mA				"						GND	GND	"	$\overline{Q}1$		"	"
		"	7					4 mA			"	2.0 V	0.7 V	2.0 V					"	Q2		"	"
		"	8						GND	GND	"	C	2.0 V	2.0 V	4 mA				"	$\overline{Q}2$		"	"
	V_{IC}		9	-18 mA							"								"	A1		-1.5	"
			10		-18 mA						"								"	B1		"	"
			11			-18 mA					"								"	CLR1		"	"
			12								"	-18 mA							"	A2		"	"
			13								"		-18 mA						"	B2		"	"
			14								"			-18 mA					"	CLR2		"	"
	I_{IL2}	3009	15 CKT A, C, D	0.4 V	4.5 V	4.5 V					"								5.5 V	A1	-100	-340	µA
		"	15 CKT B	"	"	"					"								"	A1	-30	-300	"
		"	15 CKT E	"	"	"					"								"	A1	-160	-400	"
		"	16 CKT A, C	GND	0.4 V	"					"								"	B1	-160	-580	"
		"	16 CKT B	"	"	"					"								"	B1	-30	-300	"
		"	16CKT E, D	"	"	"					"								"	B1	-200	-440	"
		"	17 CKT A,C,D,E	"	4.5 V	GND					"						GND	GND	"	CLR1	-200	-680	"
		"	17 CKT B	"	4.5 V	GND					"						GND	GND	"	CLR1	-30	-300	"
		"	18 CKT A, C, D								"	0.4 V	4.5 V	4.5 V					"	A2	-100	-340	"
		"	18 CKT B								"	"	"	"					"	A2	-30	-300	"
		"	18 CKT E								"	"	"	"					"	A2	-160	-400	"
		"	19 CKT A, C								"	GND	0.4 V	"					"	B2	-160	-580	"
		"	19 CKT B								"	"	"	"					"	B2	-30	-300	"
		"	19 CKT E, D								"	"	"	"					"	B2	-200	-440	"
		"	20 CKT A,C,D,E						GND	GND	"	"	4.5 V	GND					"	CLR2	-200	-680	"
		"	20 CKT B						GND	GND	"	"	4.5 V	GND					"	CLR2	-30	-300	"
	I_{IH1}	3010	21	2.7 V							"								"	A1		20	"
		"	22	4.5 V	2.7 V	GND					"								"	B1		"	"
		"	23	4.5 V	GND	2.7 V					"								"	CLR1		"	"
		"	24								"	2.7 V							"	A2		"	"
		"	25								"	4.5 V	2.7 V	GND					"	B2		"	"
		"	26								"	4.5 V	GND	2.7 V					"	CLR2		"	"
	I_{IH2}	"	27	5.5 V							"								"	A1		100	"
		"	28	4.5 V	5.5 V	GND					"								"	B1		"	"
		"	29	4.5 V	GND	5.5 V					"								"	CLR1		"	"
		"	30								"	5.5 V							"	A2		"	"
		"	31								"	4.5 V	5.5 V	GND					"	B2		"	"
		"	32								"	4.5 V	GND	5.5 V					"	CLR2		"	"

See footnotes at end of this table.

TABLE III. Group A inspection for device type 02 - Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open).

		MIL-	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Subgroup	Symbol	STD-883 method -	Case 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	B1	CLR1	$\overline{Q}1$	Q2	Cext2 See L	Rext2 See L	GND	A2	B2	CLR2	$\overline{Q}2$	Q1	Cext1 See L	Rext1 See L	V_{CC}		Min	Max	
1	I_{OS}	3011	33 CKT A, B, D, E	C	4.5 V	4.5 V					GND					GND	GND	GND	5.5 V	Q1	-15	-100	mA
Tc = 25°C	"	"	33 CKT C	C	4.5 V	4.5 V					"					GND	GND	GND	"	Q1	-30	-130	"
	"	"	34 CKT A, B, D, E								"	GND	GND	GND	GND				"	$\overline{Q}2$	-15	-100	"
	"	"	34 CKT C								"	GND	GND	GND	GND				"	$\overline{Q}2$	-30	-130	"
	"	"	35 CKT A, B, D, E					GND	GND	GND	"	C	4.5 V	4.5 V					"	Q2	-15	-100	"
	"	"	35 CKT C					GND	GND	GND	"	C	4.5 V	4.5 V					"	Q2	-30	-130	"
	"	"	36 CKT A, B, D, E	GND	GND	GND	GND				"								"	$\overline{Q}1$	-15	-100	"
	"	"	36 CKT C	GND	GND	GND	GND				"								"	$\overline{Q}1$	-30	-130	"
	I_{CC1}	3005	37	5.5 V	GND	5.5 V					"	5.5 V	GND	5.5 V					"	V_{CC}		11	"
	I_{CC3}	3005	38	C	5.5 V	5.5 V					"	C	5.5 V	5.5 V					"	V_{CC}		27	"
2	Same tests, terminal conditions, and limits as for subgroup 1, except T_C = +125°C and V_{IC} tests are omitted.																						
3	Same tests, terminal conditions, and limits as for subgroup 1, except T_C = -55°C and V_{IC} tests are omitted.																						
7	Truth	3014	39	A	A	B	H	L	F	F	GND	A	A	B	H	L	F	F	5.0 V	All	See notes A, B, D, E, and F		
Tc = 25°C	table	"	40	A	B	"	"	"	"	"	"	A	B	"	"	"	"	"	"	outputs			
	tests	"	41	B	A	"	"	"	"	"	"	B	A	"	"	"	"	"	"	"			
		"	42	"	"	A	L	H	"	"	"	"	"	A	L	H	"	"	"	"			
		"	43	"	"	B	H	L	"	"	"	"	"	B	H	L	"	"	"	"			
		"	44	"	B	B	"	"	"	"	"	"	B	B	"	"	"	"	"	"			
		"	45	"	B	A	"	"	"	"	"	"	B	A	"	"	"	"	"	"			
		"	46	"	A	A	L	H	"	"	"	"	A	A	L	H	"	"	"	"			
		"	47	"	"	B	H	L	"	"	"	"	"	B	H	L	"	"	"	"			
		"	48	A	"	B	"	"	"	"	"	A	"	"	"	"	"	"	"	"			
		"	49	A	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
		"	50	B	"	A	L	"	"	"	"	"	"	"	"	H	"	"	"	"			
		"	51	"	"	B	H	"	"	"	"	"	"	"	"	L	"	"	"	"			
		"	52	"	"	"	"	"	"	"	"	"	"	"	A	"	"	"	"	"			
		"	53	"	"	"	"	H	"	"	"	B	"	A	L	"	"	"	"	"			
		"	54	"	B	"	"	L	"	"	"	B	B	B	H	"	"	"	"	"			
		"	55	A	B	A	"	"	"	"	"	A	B	A	"	"	"	"	"	"			
		"	56	"	A	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"			
		"	57	"	B	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"			
		"	58	B	B	"	"	"	"	"	"	B	B	"	"	"	"	"	"	"			
8	Repeat subgroup 7 at T_C = +125°C and T_C = -55°C.																						

See footnotes at end of this table.

TABLE III. Group A inspection for device type 02 - Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open).

		MIL-	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Subgroup	Symbol	STD-883 method -	Case 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	B1	CLR1	$\overline{Q}1$	Q2	Cext2	Rext2	GND	A2	B2	CLR2	$\overline{Q}2$	Q1	Cext1	Rext1	V_{CC}		Min	Max	
9	t_{PLH1}	3003	59	IN	5.0 V	5.0 V					GND					OUT	F	F	5.0 V	A1 to Q1	5	75	ns
Tc = 25°C		Fig. 4	60					OUT	F	F	"	IN	5.0 V	5.0 V					"	A2 to Q2	"	75	"
	t_{PLH2}	"	61					OUT	F	F	"	GND	IN	5.0 V					"	B2 to Q2	"	60	"
		"	62	GND	IN	5.0 V					"					OUT	F	F	"	B1 to Q1	"	60	"
	t_{PLH3}	"	63	GND	IN	IN	OUT				"						N	N	"	CLR1 to $\overline{Q}1$	"	70	"
		"	64						N	N	"	GND	IN	IN	OUT				"	CLR2 to $\overline{Q}2$	"	70	"
	t_{PHL1}	"	65						F	F	"	IN	5.0 V	5.0 V	OUT				"	A2 to $\overline{Q}2$	"	85	"
		"	66	IN	5.0 V	5.0 V	OUT				"						F	F	"	A1 to $\overline{Q}1$	"	85	"
	t_{PHL2}	"	67	GND	IN	5.0 V	OUT				"						F	F	"	B1 to $\overline{Q}1$	"	70	"
		"	68						F	F	"	GND	IN	5.0 V	OUT				"	B2 to $\overline{Q}2$	"	70	"
	t_{PHL3}	"	69					OUT	N	N	"	GND	IN	IN					"	CLR2 to Q2	"	60	"
		"	70	GND	IN	IN					"					OUT	N	N	"	CLR1 to Q1	"	60	"
	t_{P1}	"	71	IN	5.0 V	5.0 V					"					OUT	OPEN	K	"	Q1	20	75	"
		"	72	IN	5.0 V		OUT				"						"	"	"	$\overline{Q}1$	"	"	"
		"	73	GND	IN		OUT				"						"	"	"	$\overline{Q}1$	"	"	"
		"	74	GND	IN						"					OUT	"	"	"	Q1	"	"	"
		"	75					OUT	OPEN	K	"	IN	5.0 V	5.0 V					"	Q2	"	"	"
		"	76						"	"	"	IN	5.0 V	"	OUT				"	$\overline{Q}2$	"	"	"
		"	77						"	"	"	GND	IN	"	OUT				"	$\overline{Q}2$	"	"	"
		"	78					OUT	"	"	"	"	"	"					"	Q2	"	"	"
	t_{P2}	"	79					OUT	G	G	"	"	"	"					"	Q2	70	160	"
		"	80						"	"	"	"	"	"	OUT				"	$\overline{Q}2$	"	"	"
		"	81						"	"	"	IN	5.0 V	"	OUT				"	$\overline{Q}2$	"	"	"
		"	82					OUT	"	"	"	IN	5.0 V	"					"	Q2	"	"	"
		"	83	IN	5.0 V	5.0 V					"					OUT	G	G	"	Q1	"	"	"
		"	84	IN	5.0 V	"	OUT				"						"	"	"	$\overline{Q}1$	"	"	"
		"	85	GND	IN	"	OUT				"						"	"	"	$\overline{Q}1$	"	"	"
		"	86	"	"	"					"					OUT	"	"	"	Q1	"	"	"
	t_{P3}	"	87	"	"	"					"					OUT	I	I	"	Q1	600	775	"
		"	88	"	"	"	OUT				"						"	"	"	$\overline{Q}1$	"	"	"
		"	89	IN	5.0 V	"	OUT				"						"	"	"	$\overline{Q}1$	"	"	"
		"	90	IN	5.0 V	"					"					OUT	"	"	"	Q1	"	"	"
		"	91					OUT	I	I	"	IN	5.0 V	5.0 V					"	Q2	"	"	"
		"	92						"	"	"	IN	5.0 V	"	OUT				"	$\overline{Q}2$	"	"	"
		"	93						"	"	"	GND	IN	"	OUT				"	$\overline{Q}2$	"	"	"
		"	94					OUT	"	"	"	"	"	"					"	Q2	"	"	"
	t_{P5}	"	95					OUT	J	J	"	"	"	"					"	Q2	5.7	8.0	ms
		"	96						"	"	"	"	"	"	OUT				"	$\overline{Q}2$	"	"	"
		"	97						"	"	"	IN	5.0 V	"	OUT				"	$\overline{Q}2$	"	"	"

See notes at end of this table.

TABLE III. Group A inspection for device type 02 - Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open).

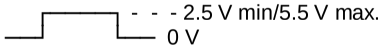
		MIL-	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Subgroup	Symbol	STD-883 method -	Case 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	B1	CLR1	$\overline{Q}1$	Q2	Cext2	Rext2	GND	A2	B2	CLR2	$\overline{Q}2$	Q1	Cext1	Rext1	V_{CC}		Min	Max	
9	t_{P5}	3003	98					OUT	J	J	GND	IN	5.0 V	5.0 V					5.0 V	Q2	5.7	8.0	ms
Tc = 25°C		Fig. 4	99	IN	5.0 V	5.0 V					"					OUT	J	J	"	Q1	"	"	"
		"	100	IN	5.0 V	"	OUT				"						"	"	"	$\overline{Q}1$	"	"	"
		"	101	GND	IN	"	OUT				"						"	"	"	$\overline{Q}1$	"		
		"	102	GND	IN	"					"					OUT	"	"	"	Q1	"	"	"
10	Same tests and terminal conditions as subgroup 9, except T_C = +125°C and limits are as follows: t_{PLH1} is 5 to 113 ns; t_{PLH2} is 5 to 90 ns; t_{PLH3} is 5 to 105 ns; t_{PHL1} is 5 to 128 ns; t_{PHL2} is 5 to 105 ns; t_{PHL3} is 5 to 90 ns; t_{P1} is 20 to 91 ns; t_{P2} is 70 to 195 ns; t_{P3} is 600 to 850 ns; and t_{P5} is 5.5 to 8.5 ms.																					
11	Same tests and terminal conditions as for subgroup 10, except T_C = -55°C																					

NOTES:

A. V_{IN} = 3.0 V minimum.

B. V_{IN} = 0.0 V or GND.

C. Apply input pulse



D. Test numbers 39 through 58 shall be run in sequence.

E. Output voltages shall be either:

H > 1.5 V; L < 1.5 V

F. Rext = 1.4 kΩ minimum to 70 kΩ maximum, connected to V_{CC}; Cext ≤ 1,000 µF, connected to Rext terminal.

G. Rext = 2 kΩ ±10%, connected to $V_{CC;}$ Cext = 80 pF ±10%, connected to Rext terminal.

I. Rext = 10 kΩ ±10%, connect to V_{CC}; Cext = 100 pF ±10%, connected to Rext terminal.

J. Rext = 10 kΩ ±10%, connect to V_{CC}; Cext = 1.0 µF ±10%, connected to Rext terminal.

K. Rext = 2 kΩ ±10%, connect to V_{CC}.

L. Note F may apply during subgroups 1, 2, and 3 testing if desired.

M. During subgroups 9, 10, 11 testing, Rext and Cext may remain applied on the side of the device not under test if desired.

N. Rext = 10 kΩ ±10%, connect to V_{CC}; Cext ≥ 45 pF connected to Rext terminal.

TABLE III. Group A inspection for device type 03.

Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open).

		MIL-STD-	Case A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14				
Subgroup	Symbol	883 method	Case 2	2	3	4	6	8	9	10	12	13	14	16	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	A2	B1	B2	CLR	$\overline{Q}$	GND	Q	Rint	NC	Cext (see l)	NC	Rext Cext (see l)	V_{CC}		Min	Max	
1 Tc = 25°C	V_{OH}	3006	1	0.7 V		2.0 V	J	2.0 V		GND	-.4 mA	GND				GND	4.5 V	Q	2.5		V
		3006	2				0.7 V	"	-.4 mA	"		4.5 V					"	$\overline{Q}$	2.5		"
	V_{OL}	3007	3				0.7 V	"		"	4 mA	4.5 V					"	Q		0.4	"
		3007	4	0.7 V		2.0 V	J	"	4 mA	"		GND				GND	"	$\overline{Q}$		0.4	"
	V_{IC}		5	-18 mA						"							"	A1		-1.5	"
			6		-18 mA					"							"	A2		"	"
			7			-18 mA				"							"	B1		"	"
			8				-18 mA			"							"	B2		"	"
			9					-18 mA		"							"	CLR		"	"
	I_{IL1} see note C	3009	10	0.4 V	4.5 V					"							5.5 V	A1	-160	-400	µA
		"	11	4.5 V	0.4 V					"							"	A2	"	"	"
		"	12			0.4 V	4.5 V			"							"	B1	"	"	"
		"	13			4.5 V	0.4 V			"							"	B2	"	"	"
		"	14					0.4 V		"							"	CLR	"	"	"
	I_{IH1}	3010	15	2.7 V	GND					"							"	A1		20	"
		"	16	GND	2.7 V					"							"	A2		"	"
		"	17			2.7 V	GND			"							"	B1		"	"
		"	18			GND	2.7 V			"							"	B2		"	"
		"	19					2.7 V		"							"	CLR		"	"
	I_{IH2}	"	20	5.5 V	GND					"							"	A1		100	"
		"	21	GND	5.5 V					"							"	A2		"	"
		"	22			5.5 V	GND			"							"	B1		"	"
		"	23			GND	5.5 V			"							"	B2		"	"
		"	24					5.5 V		"							"	CLR		"	"
	I_{OS}	3011	25 CKT A,D	GND		4.5 V	J	4.5 V		"	GND	GND				GND	"	Q	-15	-100	mA
		"	25 CKT C	GND		4.5 V	J	"		"	GND	GND				GND	"	Q	-30	-130	"
		"	26 CKT A,D				GND	"	GND	"		4.5 V					"	$\overline{Q}$	-15	-100	"
		"	26 CKT C				GND	"	GND	"		4.5 V					"	$\overline{Q}$	-30	-130	"
	I_{CC1}	3005	27	5.5 V	5.5 V	GND	GND	5.5 V		"		5.5 V					"	V_{CC}		11	"
	I_{CC2}	3005	28	J	J	5.5 V	5.5 V	5.5 V		"		5.5 V					"	V_{CC}		11	"
2	Same tests, terminal conditions, and limits as subgroup 1, except T_C = 125°C and V_{IC} tests are omitted.																				
3	Same tests, terminal conditions, and limits as subgroup 1, except T_C = -55°C and V_{IC} tests are omitted.																				
7 Tc = 25°C	Truth table test	3014	29	B	B	B	B	B	H	GND	L			K		K	5.0 V	All outputs	See notes A, B		
		"	29A	A	A	B	B	B	"	"	"			"		"	"	"			
		"	30	A	A	A	A	A	"	"	"			"		"	"	"			
		"	31	B	B	"	"	A	L	"	H			"		"	"	"			
		"	321	"	"	"	"	B	H	"	L			"		"	"	"			
		"	33	"	"	"	"	A	L	"	H			"		"	"	"			
		"	34	"	A	B	"	B	H	"	L			"		"	"	"			
		"	35	"	"	B	"	A	H	"	L			"		"	"	"			

See footnotes at end of this table.

TABLE III. Group A inspection for device type 03 – Continued.

Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.7 V, or open).

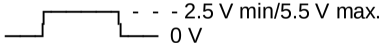
		MIL-STD-	Case A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14				
Subgroup	Symbol	883 method	Case 2	2	3	4	6	8	9	10	12	13	14	16	18	19	20	Measured terminal	Limits		Unit
			Test no.	A1	A2	B1	B2	CLR	$\overline{Q}$	GND	Q	Rint	NC	Cext (see I)	NC	Rext Cext (see I)	V_{CC}		Min	Max	
7 Tc = 25°C	Truth table test	3014	36	B	A	A	A	A	L	GND	H			K		K	5.0 V	All	See notes A, B		
		"	37	"	"	"	B	B	H	"	L			"		"	"	outputs			
		"	38	"	"	"	B	A	H	"	L			"		"	"	"			
		"	39	"	"	"	A	A	L	"	H			"		"	"	"			
		"	40	A	"	"	"	B	H	"	L			"		"	"	"			
		"	41	A	"	"	"	A	H	"	L			"		"	"	"			
		"	42	B	"	"	"	A	L	"	H			"		"	"	"			
		"	43	A	"	"	"	B	H	"	L			"		"	"	"			
		"	44	"	"	"	"	A	H	"	L			"		"	"	"			
		"	45	"	B	"	"	A	L	"	H			"		"	"	"			
8	Repeat subgroup 7 at T_C = +125° C and T_C = -55° C.																				
1	t_{PHL1}	3003	46	IN	5.0 V	5.0 V	5.0 V	5.0 V	OUT	GND				K		K	5.0 V	A1 to $\overline{Q}$	5	50	ns
Tc = 25°C	t_{PHL2}	(Fig. 3)	47	GND	GND	IN	5.0 V	5.0 V	OUT	"				K		K	"	B1 to $\overline{Q}$		61	"
	t_{PHL3}	"	48	GND	GND	5.0 V	IN	IN		"	OUT			M		M	"	CLR to Q		32	"
	t_{PLH1}	"	49	IN	5.0 V	5.0 V	5.0 V	5.0 V		"	OUT			K		K	"	A1 to Q		38	"
	t_{PLH2}	"	50	GND	GND	IN	5.0 V	5.0 V		"	OUT			K		K	"	B1 to Q		49	"
	t_{PLH3}	"	51	GND	GND	5.0 V	IN	IN	OUT	"				M		M	"	CLR to $\overline{Q}$		50	"
	$t_{P(MIN)}$	"	52	IN	5.0 V	5.0 V	5.0 V	5.0 V		"	OUT					G	"	Q		205	"
	t_{P4}	"	53	GND	GND	IN	5.0 V			"	OUT			F		N	"	Q	3.5	6.0	µs
10	Same tests and terminal conditions as subgroup 9 except T_C = +125°C and limits are as follows: t_{PHL1} is 50 to 75 ns; t_{PHL2} is 5 to 92 ns; t_{PHL3} is 5 to 48 ns; t_{PLH1} is 5 to 57 ns; t_{PLH2} is 5 to 74 ns; t_{PLH3} is 5 to 75 ns; $t_{P(MIN)}$ is 308 ns; and t_{P4} is 3.0 to 6.25 µs.																				
11	Same tests and terminal conditions as subgroup 10 except T_C = -55°C.																				

NOTES:

A. V_{IN} = 3.0 V minimum.
B. V_{IN} = 0.0 V or GND.
C. For circuit D, IIL1 limits are 120 to 360 mA.
D. Test numbers 29 through 45 shall be run in sequence.
E. Output voltages shall be either:

H > 1.5 V; L < 1.5 V

F. Cext connected to Rext/Cext through a 1,000 pF ±10% capacitor.
G. Rext/Cext connected to V_{CC} through a 5 kΩ ±10% resistor.
I. Note K may apply during subgroups 1, 2, and 3 testing if desired.
J. Apply input pulse



K. Rext/Cext connected to V_{CC} through a 5 kΩ to 180 kΩ resistor, and Cext connected to Rext/Cext through a ≤ 1,000 µF capacitor.
M. Cext connected to Rext/Cext through A ≥ 45 pF capacitor, Rext/Cext connected to V_{CC} through a 10 kΩ ±10% resistor.
N. Rext/Cext connected to V_{CC} through a 10 kΩ ±10% resistor.

5. PACKAGING

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department of Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. Microcircuits conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of the specification.

b. Complete part number (see 1.2).

c. Requirements for delivery of one copy of the quality conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.

d. Requirements for certificate of compliance, if applicable.

e. Requirements for notification of change of product or process to contracting activity in addition to notification to the qualifying activity, if applicable.

f. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action, and reporting of results, if applicable.

g. Requirements for product assurance options.

h. Requirements for special carriers, lead lengths, or lead forming, if applicable. These requirements should not affect the part number. Unless otherwise specified, these requirements will not apply to direct purchase by or direct shipment to the Government.

j. Requirements for "JAN" marking.

6.3 Superseding information. The requirements of MIL-M-38510 have been superseded to take advantage of the available Qualified Manufacturer Listing (QML) system provided by MIL-PRF-38535. Previous references to MIL-M-38510 in this document have been replaced by appropriate references to MIL-PRF-38535. All technical requirements now consist of this specification and MIL-PRF-38535. The MIL-M-38510 specification sheet number and PIN have been retained to avoid adversely impacting existing government logistics systems and contractor's parts lists.

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List QML-38535 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DSCC-VQ, 3990 E. Broad Street, Columbus, Ohio 43123-1199.

6.5 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535, MIL-HDBK-1331, and as follows:

GND ..... Ground zero voltage potential
I_{IN} ..... Current flowing into an input terminal
V_{IC} ..... Input clamp voltage
V_{IN} ..... Voltage level at an input terminal

6.6 Logistic support. Lead materials and finishes (see 3.4) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class B (see 1.2.2), lead material and finish A (see 3.4). Longer length leads and lead forming should not affect the part number.

6.7 Substitutability. The cross-reference information below is presented for the convenience of users. Microcircuits covered by this specification will functionally replace the listed generic-industry type. Generic-industry microcircuit types may not have equivalent operational performance characteristics across military temperature ranges or reliability factors equivalent to MIL-M-38510 device types and may have slight physical variations in relation to case size. The presence of this information should not be deemed as permitting substitution of generic-industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-PRF-38535.

Military device type	Generic-industry type
01	54LS123, 74LS123
02	54LS221, 74LS221
03	54LS122, 74LS122

6.8 Manufacturers' designation. Manufacturers' circuits, which form a part of this specification, are designated as shown in table IV herein.

TABLE IV. Manufacturers' designation.

Manufacturers					
Device type	A	B	C	D	E
	Texas Instruments Inc.	Signetics Corporation	National Semiconductor Corp	Motorola Inc	Raytheon Company
01	X		X	X	
02	X	X	X	X	
03	X		X	X	X

6.9 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5962-1964)

Review activities:
Army - MI, SM
Navy - AS, CG, MC, SH, TD
Air Force - 03, 19, 99

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-M-38510/314C	2. DOCUMENT DATE *(YYYYMMDD)* 2003-07-14

3. DOCUMENT TITLE
MICROCIRCUITS, DIGITAL, LOW-POWER SCHOTTKY TTL, MONOSTABLE MULTIVIBRATORS, MONOLITHIC SILICON

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) DSN *(If applicable)*	7. DATE SUBMITTED *(YYYYMMDD)*

8. PREPARING ACTIVITY

a. NAME Defense Supply Center, Columbus	b. TELEPHONE *(Include Area Code* (1) Commercial 614-692-0536 (2) DSN 850-0536
c. ADDRESS *(Include Zip Code)* DSCC-VA P. O. Box 3990 Columbus, Ohio 43216-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703)767-6888 DSN 427-6888